CLAIMS

1. Method of detecting a plurality of symbols $(\mathbf{d}_k(i))$ transmitted by or for a plurality K of users, each symbol belonging to a modulation constellation and being the subject of a spectral spreading by means of a spreading sequence, the said method comprising a filtering step $(310_1,..,310_K)$ adapted for supplying a complex vector $(\mathbf{y}(i), \tilde{\mathbf{y}}(i))$ characteristic of the said received signal, characterised in that the said complex vector is decomposed into a first vector $(\mathbf{y}^R(i),\tilde{\mathbf{y}}^R(i))$ and a second vector $(\mathbf{y}^I(i),\tilde{\mathbf{y}}^I(i))$ and in that at least the closest neighbours of the first and second vectors are sought (330, 331) within a lattice of points (Λ,Ω) generated by the said modulation constellations, the transmitted symbols being estimated from the components of the said closest neighbours.

2. Detection method according to Claim 1, characterised in that the spreading sequences $(s_k(t))$ consist of real multiples $(s_k^0(t))$ of the same complex coefficient (σ).

3. Detection method according to Claim 1 or 2, characterised in that the search is limited to a first set of points in the lattice belonging to a first predetermined zone (Σ_R) around the first vector and a second set of points in the lattice belonging to a second predetermined zone (Σ_I) around the second vector.

4. Detection method according to Claim 1 or 2, characterised in that the search is limited to a first set of points in the lattice belonging to a first predetermined zone (Σ_R) around the origin and a second set of points in the lattice belonging to a second predetermined zone (Σ_I) around the origin.

5. Detection method according to Claim 3 or 4, characterised in that the said first and second predetermined zones are spheres.

6. Detection method according to one of the preceding claims, characterised in that the search for the closest neighbour of the first vector is effected on a plurality of components thereof, the search being limited for each of the said components to an interval defined for a lower bound and an upper bound, the said bounds being chosen

so that the said interval does not comprise points relating to symbols which cannot belong to the modulation constellation.

7. Detection method according to one of the preceding claims, characterised in that the search for the closest neighbour of the second vector is effected on a plurality of components thereof, the search being limited for each of the said components to an interval defined for a lower bound and an upper bound, the said bounds being chosen so that the said interval does not comprise points relating to symbols which cannot belong to the modulation constellation.

8. Detection method according to one of the preceding claims, characterised in that, prior to the search for the closest neighbour, the first vector ($\mathbf{y}^R(i)$) is subjected to a matrix processing (320) aimed at substantially decorrelating the different noise components thereof.

9. Detection method according to one of the preceding claims, characterised in that, prior to the search for the closest neighbour, the second vector ($\mathbf{y}^I(i)$) is subjected to a matrix processing (321) aimed at substantially decorrelating the different noise components thereof.

10. Detection method according to one of the preceding claims, characterised in that the said search step is extended to the search for a first set of points which are the closest neighbours of the said first vector, referred to as first neighbours, and a second set of points which are closest to the said second vector, referred to as second neighbours, and in that the transmitted symbols are estimated flexibly from symbols generating the said first and second neighbours and distances separating the said first neighbours from the first vector on the one hand and the said second neighbours from the said second vector on the other hand.

11. Detection method according to one of the preceding claims, characterised in that the contributions of each user to the signals obtained by the adapted filtering step are determined from the estimated symbols and in that, for a given user k, the contributions of the other users corresponding to the symbols already estimated are eliminated at the output of the filtering step.

12. Detection method according to one of Claims 1 to 10, characterised in that the contributions of each user to the received signal are determined (340) from the estimated symbols and in that, for a given user k, the contributions of the other users corresponding to the symbols already estimated are eliminated at the input of the filtering step.

13. Detection method according to one of Claims 1 to 10, characterised in that, the symbols of the said K users being transmitted synchronously, the said lattice of points is of dimension K.

14. Detection method according to Claim 11 or 12, characterised in that, the symbols of the said K users being transmitted asynchronously and propagating along a plurality of paths, the dimension of the lattice is equal to the number of symbols of the different users which may interfere and are not yet estimated.

15. Device for detecting a plurality of symbols ($\mathbf{d}_k(i)$) transmitted by or for a plurality K of users, each symbol belonging to a modulation constellation and being the subject of a spectral spreading by a spreading sequence, the device comprising means for implementing the method claimed according to one of the preceding claims.

16. Receiver for a DS-CDMA mobile telecommunication system comprising a detection device according to Claim 15.